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ABSTRACT

The project described is a renewal of earlier work on Individualized Instruction for Data Access (IIDA), a program designed at Drexel University to aid users in searching a database with the computer acting as assistant. This quarterly report discusses the evaluation of IIDA through user interaction. Two types of evaluation were performed: formative evaluation, monitoring system development and providing feedback leading to further refinement; and summative evaluation, which was concerned with the impact and effectiveness of the IIDA system. Formative evaluation was achieved through observation of system use by three groups: computer science majors, actual users, and library and information science graduate students and faculty. Programming errors were uncovered and system responses examined through this test of the system. Summative evaluation was carried out through observation of searches performed by two groups of novice users--new students at the school of library and information science, and engineering students taking a technical writing course. Evaluative questionnaires were also completed by the two groups of novice users, and the results are briefly summarized. Search topics, questionnaires, and course requirements for the novice users are contained in appendices. (SW)

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INDIVIDUALIZED INSTRUCTION FOR DATA ACCESS (IIDA)

Quarterly Report No. 7
December, 1979

Drexel University, School of Library
and Information Science
Franklin Institute Research Laboratories

NSF Grant No. DSI 77-26524

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1. OVERVIEW

This project is a renewal of earlier work on Individualized Instruction for Data Access (IIDA). Begun in July 1976, with initial funding for one year, the project was resumed in April 1978, and is to be completed in two years. This series of quarterly progress reports is planned to report in depth on selected aspects of the project, and to contain a brief overall progress statement in each report.

The project staff are divided into two groups. The computer group has been concerned with the design, implementation, and testing of the requisite computer programs. From the user's standpoint, there are four major subsections of the total system. In the first exercise, the program leads a user through a basic search in lock-step fashion, introducing some basic search commands, and providing familiarization with the general structure of a search.

The second exercise allows the user to do a search. The topic is suggested to him, one simple enough that there is a high expectation of a successful search. The user is free to carry out his own search as he wants. In this exercise, the program uses a core set of diagnostic routines and rules to monitor the activity of the user and to provide various kinds of feedback or assistance. In addition, the user has access to several kinds of help should it be requested.

The third exercise represents advanced search training in that, as in exercise one, the user is introduced to search commands and their use. The additional commands introduced here include such things as variations on SELECT, and the shorthand notations for DIALOG commands. In addition, the user is introduced to a number of other advanced topics.

In the assistance mode (or "fourth exercise"), the user does a search of his choosing, now having been exposed to commands beyond the basic ones, and to strategic concepts.

By the end of February 1979, the first and second exercises had undergone system debugging. Preliminary formative evaluation was conducted in early March by various kinds of computer literate users actively looking for flaws in the system. With the second exercise providing a nucleus for the assistance mode program, both the third exercise and the assistance mode were ready for use in evaluation testing during the summer of 1979.

The behavioral group of the project staff is concerned with both formative and summative evaluation of IIDA. In formative evaluation, our concern has been with monitoring system development and with providing feedback and information leading to refinement and further development of the system. For example, a number of the diagnostic rules incorporated into the second exercise and the assistance mode require specification of a threshold value. Initially these values were set by intuition or arbitrary choice. However, the use of the system has enabled revision of some of the threshold values towards more appropriate levels.

In summative evaluation, the concern of the behavioral group is with assessment of the impact and effectiveness of the IIDA system, and with the extent to which the objectives of the project have been met. In the body of this report there is a discussion of the initial formative evaluations conducted with the system as well as a report on two studies conducted at Drexel which provide us with information on both formative and summative evaluation. In the report which follows this one, there will be a discussion of the conduct and results of two field studies which constitute the summative evaluation of IIDA.

Given the structure of the IIDA system, it is possible to ask two major kinds of questions. The first of these is about the effects of IIDA when the system operates only as an assistant. When dealing with this question, it is assumed that the user has previously had a reasonable amount of training in DIALOG searching, and engages IIDA only through the assistance mode. The second major kind of question one can ask has to do with the effectiveness of the IIDA exercises in teaching new users how to do bibliographic information retrieval. When dealing with this issue, it is assumed that the user has had no previous direct experience with searching, and utilizes the capacities of IIDA as both instructor and assistant.

2. EVALUATION

2.1 Initial Formative Evaluation

2.1.1 Project staff. Once exercises one and two had been made operational, and on an ongoing basis ever since, the various exercises were subjected to review and modification by the project staff. All members of the staff have spent time intereacting with IIDA as users in order to look for flaws or ways to improve the operation of the system.

2.1.2 Computer science majors. During the first week of March 1979, three undergraduate students who were members of the Mathematics and Computer Science Club at Drexel tested the IIDA system for conceptual and programming flaws. The emphasis in this testing was upon exercise two. None of the three students had had any experience with on-line searching, but each of them had had extensive experience working with computer languages and systems. They were given a half-hour of instruction in the basics of searching and of the IIDA system as it was intended to perform upon final implementation. This instruction was given informally by one of the project's research assistants who was an experienced searcher. Next, the student was logged on to IIDA (in exercise two), and challenged to try to find the flaws, or try to "break" the system.

All three of the students were able to search successfully using IIDA, and ran into very few problems. All three found a programming error which was subsequently corrected. The error consisted of neglecting to reset an array in one of the diagnostic programs back to zero at the appropriate time. The size of the array eventually overran the available storage space during the course of the search, and the program then bumped the students from the system prematurely.

In post-session interviews, the general responses from the students were, for the most part, favorable. All three were impressed with their ability to get useful and interesting results from their first attempts at on-line searching. They also seemed pleased with IIDA's responses to searcher input. One searcher was particularly impressed with IIDA's assistance in getting him started. After the initial BEGIN command (which IIDA prompts the user to enter), the user did not know what to do, so he entered "no." IIDA responded with "IIDA does not understand your command." "For an explanation of acceptable commands, enter '/help'." The student did so, and received enough assistance to perform a satisfactory search.

There were two major criticisms of IIDA's responses to the users. One was that the error message stating that the user was not responding quickly enough (i.e,, that there was an "excessive" delay time between commands) was very annoying; the threshold value for the time limit has since been extended. The second criticism, made by one of the students, was that IIDA tended to be overly verbose. The student suggested in particular that the message telling the user that he will be expected to rate the relevance of all records viewed after a TYPE command should be stated only once rather than after each TYPE command entered.

2.1.3 "Real" searches. A number of searches done by real searchers were re-done through exercise two in order for us to look at the responses of the system to "real" searches. The seventy-two searches involved were taken from the set of searches collected in a study on search process assessment described briefly in an earlier report (1), and in much greater depth by Fenichel (2).

Basically, the searches were done on eight different topics by several journeyman searchers who received some of the problems by mail, did the

searching using their own terminals, and returned the search transcripts by mail. Every member of the project staff--both programming and behavioral groups--duplicated a minimum of four searches through exercise two. Thus, all members of the project staff were involved in looking for flaws that needed to be corrected. In addition, all of the staff members were able to gain first-hand experiences with how IIDA would have treated the user who had done the search. While no major substantive changes were immediately made in the system as a result of this exercise, it was of particular benefit in insuring that the entire staff had a coherent and complete feel for the project as a whole rather than for just that subcomponent upon which each happened to be working at the time. Further, it was also of benefit in helping to provide a basis for later decisions about various questions which arose about such issues as how and what to implement in the way of messages from IIDA, etc. Finally, it provided various staff members with an important background context against which to weigh various user comments collected at the time of use or during post-use interviews and discussions.

2.1.4 Library and Information Science faculty and graduate students. Three graduate students and two faculty members of the Drexel University School of Library and Information Science also went through the entire set of IIDA exercises (exercises one through three) before testing was begun with novice users. Once again, these tests were useful in that they uncovered a few programming errors which had not yet been discovered and corrected. All of these users were experienced with on-line bibliographic searching, and generally liked the IIDA program. However, these users were not really useful in detecting problems with the content of the instructional program from the novice user's point of view. In later testing, undergraduate engineering students with no library training or bibliographic

searching experience found serious difficulties in both comprehending the material in exercise one, and in absorbing the bulk of the material in exercise three. Apparently it was difficult for the library school test participants, given their familiarity with on-line searching, to appreciate the way a complete novice would respond to the instructional material.

2.2 Second Stage Evaluation

In looking at the issue of how well IIDA is able to perform as an assistant during the search, we are basically concerned with users who have already had a reasonable degree of search training, and consequently are to be exposed to IIDA only through the assistance mode. In an earlier report (1), several possible studies were described in order of their priority. All of the studies were in part shaped by considerations of the available resources for conducting possible studies. For example, given that users could only access the system one at a time, any user group had to be available for more than one session. One such available group was composed of new graduate students in the Drexel School of Library and Information Science.

2.2.1 Fundamentals of Library and Information Science user group. Each year the School of Library and Information Science at Drexel Univesity admits a number of new graduate students. When these students are admitted, they are required to register for a course entitled, "Fundamentals of Library and Information Science." One of the components of this course is a block of instruction in computer-based bibliographic searching. This block of instruction, totaling roughly thirteen hours, includes both classroom lectures and hands-on laboratory experience in searching. The "Fundamentals" students were recommended as a group for study not only

because of their accessibility, but also because they knew how to search at a novice level, were fairly homogeneous in training and experience, and could be expected to experience some problems with their searches which would trigger the diagnostics.

(1) Procedure. The study was accomplished by recruiting volunteers from the summer term 1979 "Fundamentals" class. The project member who did the recruiting stressed the opportunity for the students to gain additional experience in searching. From a class of twenty-six students, there were twenty-two volunteers. Of these twenty-two, seventeen actually began the study. All of those students who began completed. Each student was asked to conduct two searches. The same two search requests were given to all of the students in the same order. Since some of these students may ultimately go on to become intermediaries, the statement of the problem was much like those that they could expect to receive except that in this case they were unable to interact with the person submitting the request. The requests used appear in Appendix A.

Randomly, one-half of the users were assigned to conduct the two searches with IIDA assistance, while the other half were assigned to conduct the searches without IIDA assistance. In both cases, the searching was done through the IIDA system so that search records were kept automatically, but with the no-IIDA assistance group, the interactive messages were suppressed so that the users were not given the IIDA feedback. None of the users in this group were exposed to the instructional programs. The randomization was accomplished by making up, in advance, the randomization schedule, and then assigning each student to a group according to the schedule as that student appeared at the laboratory for his or her first appointment.

Those users who searched without IIDA assistance were advised to try to remember the commands and material which they had learned in the classroom instruction. They were also informed that they could use anything they had learned in their class, but that the assistants were not able to advise them about what would work or how to implement particular commands. Those users who searched with IIDA assistance were simply advised to do so rather than to ask questions of the assistants. In order to try to reduce the possibility of advance preparation on the part of the participants, each of the users was asked not to discuss the search topics or their searches with their classmates until the entire study had been completed by all of the participants. Most of the users did their searching in two half-hour sessions on two different days.

(2) Results. Although seventeen students took part in this study, the results for only eleven of them will be reported. One of the system difficulties encountered during the summer pilot testing of IIDA involved a failure to transfer some of the machine recorded student records from temporary memory storage. Thus, these records were written over by new users' records before they had been output in hard copy form. This loss of records did not appear to be statistically related to the individual user's group membership.

The eleven users discussed here are those for whom the machine recorded diagnostic data were available for the second of the two searches. Basically, four kinds of data will be discussed below. These are: (a) demographic information collected on the pre-test questionnaires; (b) the frequencies with which the various categories of machine diagnostics were activated; (c) various attitude measures collected on the post-test questionnaires;

and (d) a description of the remarks made by the IIDA users on the post-test questionnaires. The questionnaires used for this study appear in Appendix B.

(a) Demographics. In terms of their demographic characteristics, the eleven users all had a bachelor's degree, and none had any advanced degrees. Among the six females and one male in the group which used IIDA assistance, there were two students who indicated having a degree in Library Science, two who indicated a degree in the Liberal Arts, two in the Social and Behavioral Sciences, and one in the Biological Sciences. Among the five women in the group who searched without IIDA assistance, there was one with a degree in the Physical Sciences, and the rest had Liberal Arts degrees. Looking at undergraduate course work in terms of two clusters of courses--one cluster of courses being those in Mathematics, Computer Science, Physical Science and Engineering, with the other cluster of courses being those in the Biological, Social, and Behavioral Sciences--there were no significant differences between the two groups (Mann-Whitney U Test).

In terms of their exposure to computers and bibliographic searching, the two groups seemed to be quite similar in that while two of the students in the no-IIDA group were the only ones to report knowing a computer language, the two groups did not differ in describing their computer skills as virtually non-existent (Mann-Whitney U Test), and none of the users reported having any experience with computer packages such as SPSS or SAS. All of the participants except one in the IIDA group reported having done some on-line searching before beginning the study. While two of the five users in the no-IIDA assistance group had had someone do on-line searching for them,

and three of the seven in the IIDA assistance group had had someone do searching for them, none of the users indicated having it done more than twice.

(b) Diagnostics. For those users where the machine records of the number of times various diagnostics were triggered were available, the data for the two groups are reported in Tables 1 and 2. These diagnostic procedures fall into three broad classes: a) Syntactic, b) Local Context, and c) Global Context. For the first category, the concern is with the validity of a command, and this consideration is entirely context-free. The guiding operational principle is that a command is valid if and only if it would be accepted by DIALOG.

Given that a command satisfies the context-free structural rules, there may yet be problems that range from fatal errors (such as the use of an undefined set number in a COMBINE command), to mere inelegance of usage (such as repeating a previous command). The context of the analysis is limited, and the commands are examined in the context of the accumulated history of previous commands. For the global context diagnostics, the concern is with a set of commands as an entity rather than with individual commands. The non-syntactic diagnostic procedures are actually implemented as a series of rules, not unlike rules in a formal decision table. These various categories of rules are described completely in a previous report (3).

Comparisons of the two groups conducted using the Mann-Whitney U Test revealed that they did not differ statistically from each other in terms of the frequencies with which the various categories of diagnostics were invoked during the process of searching. There is, however, on the total number of "errors" a difference which is of borderline significance ($U = 8$, $p = .074$,

Diagnostic Category	User 1	2	3	4	5
1. Syntax	2	3	7	6	0
2. Command Repetition	1	1	1	0	0
3. Uninformative Formats	0	0	0	0	0
4. Null Sets Created	0	0	0	0	4
5. Unused Sets	0	0	2	0	0
6. Time	0	0	0	0	0
7. Viewing Requests Excessive	0	0	0	0	0
8. String/Cycle Length	1	1	5	0	1
9. Thrashing	0	1	0	0	0
10. Dwelling	1	0	9	0	0
11. Local (2 + 3 + 4 + 5 + 6 + 7)	1	1	3	0	4
12. Global (8 + 9 + 10)	2	2	14	0	1
Total (1 + 11 + 12)	5	6	24	6	5

Table 1. Frequency of Diagnostics fo No-IIDA Group.

Diagnostic Category	User 1	2	3	4	5	6	7
1. Syntax	1	1	1	5	0	0	1
2. Command Repetition	1	0	0	1	0	1	0
3. Uninformative Formats	0	0	0	0	0	0	0
4. Null Sets Created	0	0	0	0	0	2	0
5. Unused Sets	0	1	0	0	1	0	0
6. Time	0	0	0	0	0	0	0
7. Viewing Requests Excessive	0	0	0	1	0	0	1
8. String/Cycle Length	2	5	1	0	0	0	0
9. Thrashing	0	1	0	0	0	0	0
10. Dwelling	0	0	1	0	0	0	0
11. Local (2 + 3 + 4 + 5 + 6 + 7)	1	1	0	2	1	0	1
12. Global (8 + 9 + 10)	2	6	2	0	0	0	0
Total (1 + 11 + 12)	4	8	3	7	1	3	2

Table 2. Frequency of Diagnostics for IIDA Assistance Group.

one-tailed), and which suggests the possibility of IIDA assisted users making fewer overall "errors." While it is not reasonable to try to make much out of this finding, it is at least reassuring to find that the IIDA assistance does not appear to make searching more difficult or more complicated for the user.

(c) Attitudes. The only differences between the two groups found in examination of the attitude measures on the post-test questionnaires showed up on two questions. While the IIDA assisted group showed a higher level of agreement with the statement that the assistance mode of IIDA had helped in searching more effectively (Mann-Whitney $U = 4.5$, $p < .05$), it was the no-IIDA group which indicated the highest degree of agreement with the statement that the IIDA searching had been enjoyable (Mann-Whitney $U = 6$, $p < .05$).

(d) Post-search comments. When asked to give their positive impressions of IIDA, the IIDA assisted users mentioned a wide variety of things rather than all agreeing on just a few points. For example, one user appreciated the system automatically calling TYMNET to reach DIALOG. Another found the syntax error criticisms and comments on search techniques employed (e.g., thrashing) to be helpful. In addition, participants reported liking: "the well-explained introduction and commands," "the clear and natural language," "the usefulness of the help mode as well as the ability to evaluate citations," and, "the indication of errors and the need for assistance."

When asked to give the negative impressions of IIDA, a few of the participants reported finding the instructions unclear and complicated. One user felt that the vocabulary was too technical and overly wordy. Another

disliked IIDA's limiting the size of the set of citations that could be viewed with a single TYPE command. A few of those users who did not search with IIDA assistance complained of the lack of help and expressed feeling frustrated and unprepared.

None of the participants reported anything that they thought should have been working in IIDA which was not. When asked to describe situations where IIDA did the wrong thing, a few of the participants reported instances of minor system flaws. Most of these turned out to have been related to phone connection problems.

Upon being asked when they felt they knew enough to search without IIDA's assistance, the users gave replies ranging from, "before beginning," to, "after the second search." One user reported, "when my results came out the way I expected." When asked to explain their reasons for feeling they could or could not search without IIDA assistance, a few users felt that they were not familiar enough with searching and needed more experience. A few others felt that they were confused by IIDA's instructions, and did not learn enough to search without assistance. On the other hand, one user felt she no longer needed assistance because the system was simple to use, and one reported feeling she could search without IIDA because of prior experience.

(3) Discussion. The users described in this study were all trained but inexperienced searchers, some of whom did searches with IIDA assistance. In general, the reactions of those who did their searches with IIDA were positive in that they felt the system had provided them with valuable or worthwhile assistance. While there does not appear to be any effect of IIDA assistance upon the frequency with which the diagnostics are triggered during a search, the number of searchers in each group is relatively

small, and so there may be effects which have not been detected. It is reassuring, however, to find that it appears as though the direction of differences would favor the IIDA group if the results were significant. This would seem to make it reasonable to assume that even if IIDA assistance does not measurably improve the searcher's performance, it also does not seem to impair it.

2.2.2 Technical writing user group.

Turning to the issue of how well IIDA is able to perform the service of enabling novice users to do a successful search, the concern is basically with a user group which has had no previous experience, either direct or instructional, with computerized information retrieval. One such available group of users was found among Drexel undergraduate engineering students. Roughly four years ago, Drexel University's College of Engineering instituted a course requirement in technical writing for all engineering students. Each term there are several sections of this course offered. Several of the faculty involved in teaching this course agreed and felt quite strongly that it would be a relevant educational experience for the students to learn something about bibliographic information retrieval. Many Drexel engineering graduates will be employed by organizations which utilize the services of information retrieval specialists. Presumably students who have had some direct exposure to searching should be better able to work with the people doing the searching.

As this study was originally planned (1), both the pedagogical and experimental requirements were to have been satisfied by having each student perform a search on a self-selected topic in each of two ways. One method would have been to have the search done through learning to do and actually doing the search through IIDA. The second method would have been to have

the search done through the more conventional process of working with a library intermediary who would have actually conducted the search. Each student would have been randomly assigned either to do the search first with IIDA, or to do the search first with the intermediary. This would have allowed comparisons between the searches done by IIDA trained and assisted users, and the searches done by a single previously trained and experienced searcher.

This study design was abandoned, however, about a week before the beginning of its planned start in the summer term of 1979. Because of a complicated set of equipment and scheduling problems, and the resulting shortage of access time to DIALOG, it became clear that it was a physical impossibility to conduct the study as planned. However, contingency plans had been prepared in advance, and after consultation with the technical writing instructors, the project staff, and the project evaluation consultant, the decision was made to simply provide a number of the students with IIDA training and search assistance. Thus, the study reported below is descriptive rather than experimental in nature.

(1) Procedure. In all, thirty-five undergraduate students were contacted through two sections of the technical writing class in the summer term of 1979. Student participation in the IIDA training was strongly encouraged by the instructors of the two sections involved. Participation was not, however, a class requirement in the sense that a student would be graded negatively for not participating. The IIDA training was integrated with the technical writing course work in that the results of the searching were potentially useable for the students in preparation of required assignments for the course. A syllabus for the course appears in Appendix C.

It was originally intended that the students would complete the IIDA training, and the assisted search of their choice, in two two-hour sessions, doing two of the four exercises in each session. All participants were scheduled by mutually agreed upon appointments during the available periods of access to the equipment and the system, with the scheduling being kept as flexible as possible to accommodate the problems of students with jobs, etc. For example, many sessions were scheduled in the late afternoon, early evening, and on Saturday morning.

When the students reported to the IIDA lab for their first appointment, one of the three IIDA assistants greeted them and asked each of them to fill out a pre-training questionnaire which was used to collect basic data about the user group. All of the questionnaires used in this study appear in Appendix D. Next, the assistant logged the student onto the IIDA training program, explaining that the first exercise included an introduction to, and basic instruction in, searching. The student was also told that he or she should continue on after completing exercise one, and do exercise two, which consisted of a practice search. The student option at this point was to do either a search of his or her own choice within the constraints of exercise two, or to do a search on one of a set of two topics which were provided by the IIDA staff. These two searches are contained in Appendix E. When the second exercise had been completed, the student was asked to fill out the intermediate questionnaire.

The second appointment followed a similar pattern. Exercise three was introduced as a continuation of exercise one and of more detailed instruction. Exercise three was followed by "exercise four" which is the assistance mode of IIDA, and which gives the user the opportunity to do an unconstrained search on his or her own topic. For those students who did not have a topic

that they particularly wanted to search, a list of "graduation exercise" searches was provided. These searches are listed in Appendix F. Upon completion of exercise four, the user was asked to fill out the post-training questionnaire.

During all phases of the searching exercises, the IIDA assistants urged the participants to utilize the help facilities of IIDA rather than to try to rely on the assistants to answer questions. Some participants found bibliographic on-line searching so foreign to their experience, or were so hesitant about working with a computer, that they needed help with the BEGIN command. In this case, the IIDA assistant would guide the user. Further, some participants did not remember all of the commands. When a user would ask how, for example, one could view some of the sets created, the IIDA assistant would remind the user of the TYPE command. However, if the user did not know how to use that command, the assistant would advise the user to seek help. Generally, the assistants would volunteer information on such topics as: how to correct a character or cancel a line of print, how to return to DIALOG from the help library, and how to use AND or OR while combining sets.

Occasionally, a participant was dropped from the system as a result of a failure either by the DIALOG computer, the Multics computer, or the network. When this occurred toward the end of exercise two or four, if the user felt the exercise was completed to his or her satisfaction, and if the IIDA assistant agreed, then that exercise was said to be completed. Generally, however, incomplete exercises were re-started. No student was forced or coerced into doing any of the exercises. For example, one participant chose not to do exercise three after hearing classroom rumors that this exercise was boring. He felt that he had seen enough through the use of help in

exercise two. Another user quickly tired of exercise three, after completing only two of the eight frames, and went on instead to begin his search in exercise four. It was interesting to note, however, that he asked many questions which would have been answered in exercise three. Also, he, along with a number of other participants, seemed reluctant to use the help facility.

(2) Results. Although initially thirty-five students were originally recruited for this study, thirteen dropped out or did not finish all four of the exercises for one reason or another. Two dropped the course and so dropped participation in the study. Another two indicated that there was simply "too much hassle" in getting on the system and having it break down. One said that he had enough information from the second exercise for purposes of the course, and another claimed to have no topic she wanted to search. For the remainder of the dropouts, there was no reason given. Usually they would just not show up for their appointments or would call in with some reason for being unable to keep an appointment.

Based upon user comments, instructor feedback, and a post-training debriefing conducted with one of the technical writing classes as a group, the high dropout rate is attributable to two major factors. The first of these was the length and amount of material covered in exercise three as it was structured for these users. This experience led to a major restructuring of the exercise. The second factor contributing to the high dropout rate was a relatively high frequency of system difficulties external to the IIDA programs. While occasional problems were encountered with the autocall device which placed the TYMNET phone call to the DIALOG computer, more often there were problems with DIALOG going down. However, the single most

frequent set of problems arose from network difficulties which resulted in several participants being required to schedule more than two sessions in order to complete the exercises. Some users simply refused, others disappeared.

The eighteen users discussed here are those who completed all four exercises, and for whom the machine recorded diagnostic data were available for the exercise four, or assistance mode, search. The system difficulty which resulted in the loss of some student records occurred during a period of time when both users from this group and from the Library and Information Science graduate students user group were being scheduled for sessions with IIDA. As with the Library and Information Science user group, basically four kinds of data will be discussed below. These are: (a) demographic information collected on the pre-training questionnaires; (b) the frequencies with which the various categories of machine diagnostics were activated; (c) various attitude measures collected on the post-test questionnaires; and, (d) a description of the remarks made by the IIDA users on the post-test questionnaires.

(a) Demographics. The eighteen users in this group were all advanced undergraduates with no sophomores and only two seniors in the group. Five of the group were female, and none of the group had any advanced degrees. By major, there were fifteen Engineering students of various types, with Electrical Engineering being the major most frequently named. Among the three non-engineers, one was a Business major, and the other two were majors in Clinical Dietetics. All of the user group reported a pattern of course work consistent with the reported majors. While there was some individual variation, the users reported a heavy emphasis upon

Mathematics, Science, and Engineering, with most having only introductory courses in the Biological, Social, and Behavioral Sciences.

While a few of the users reported having no computer skills, the average self-rating of computer skills fell into the category, "good enough to get by." Only four of the eighteen reported knowing no computer languages. Three of these four were Engineering majors, and one was a Clinical Dietetics major. For those users who reported knowing a computer language, the average number of languages known was 1.9, with a range of one to five languages. The modal number was one. None of the users reported having any experience with pre-programmed library packages such as SPSS. With respect to bibliographic on-line searching, none of the users had ever done bibliographic searching before, and only two reported having had it done for them. One of the two had had it done twice; the other, four times.

(b) Diagnostics. Table 3 reports the frequencies with which the individual users searching behavior triggered the IIDA diagnostics. The totals for each category are presented in Table 4. Because of the considerable on-line interference encountered during much of the summer, some "errors" reported by the computer were not caused by the searchers. The search transcripts were examined in detail by the IIDA staff, and the machine reported frequency for the various categories was adjusted to remove errors which were in fact a result of a technical problem with the system. Those technical faults or errors which resulted from a malfunctioning of the IIDA programs were also brought to the attention of the system programmer so that future repetitions could be minimized or entirely avoided. A discussion of the re-scoring procedures appears in Appendix G.

(c) Post-training measures. Table 5 reports the inter-correlations among several variables from the post-training questionnaire

Diagnostic Category	User 1	2	3	4	5	6
1. Syntax	0	1	7	3	5	5
2. Command Repetition	0	0	1	0	0	1
3. Uninformative Formats	0	0	0	0	0	0
4. Null Sets Created	8	0	0	3	1	0
5. Unused Sets	0	0	1	0	0	1
6. Time	0	0	0	0	6	0
7. Viewing Requests Excessive	2	3	0	0	1	0
8. String/Cycle Length	1	1	0	2	3	0
9. Thrashing	0	0	0	0	0	0
10. Dwelling	0	0	0	0	0	0
11. Relevance	3	1	1	3	1	2
12. Local (2 + 3 + 4 + 5 + 6 +7)	10	3	2	4	8	2
13. Global (8 + 9 + 10 + 11)	4	2	1	5	4	2
Total (1 + 12 + 13)	14	6	10	12	17	9

Table 3. Frequency of Diagnostics.

Diagnostic Category	User 7	8	9	10	11	12
1. Syntax	6	2	3	7	0	4
2. Command Repetition	0	1	0	0	0	0
3. Uninformative Formats	0	0	0	0	0	0
4. Null Sets Created	5	1	0	2	1	0
5. Unused Sets	0	1	0	0	0	0
6. Time	2	0	2	0	0	0
7. Viewing Requests Excessive	0	2	0	1	1	3
8. String/Cycle Length	2	8	0	0	0	1
9. Thrashing	0	0	0	0	0	0
10. Dwelling	0	0	0	0	0	0
11. Relevance	15	5	1	7	9	2
12. Local (2 + 3 + 4 + 5 + 6 +7)	9	5	3	3	2	3
13. Global (8 + 9 + 10 + 11)	17	13	1	7	9	3
Total (1 + 1[illegible] + 13)	32	20	7	17	11	10

Table 3 (Cont.). Frequency of Diagnostics.

Diagnostic Category	User 13	14	15	16	17	18
1. Syntax	1	10	1	14	1	12
2. Command Repetition	0	0	0	0	1	0
3. Uninformative Formats	0	0	0	0	0	0
4. Null Sets Created	0	0	0	3	0	0
5. Unused Sets	0	0	0	0	1	0
6. Time	0	0	0	0	0	0
7. Viewing Requests Excessive	0	4	0	1	1	0
8. String/Cycle Length	0	0	0	3	0	0
9. Thrashing	0	0	0	0	0	0
10. Dwelling	0	0	0	0	0	0
11. Relevance	3	3	0	5	0	0
12. Local (2 + 3 + 4 + 5 + 6 + 7)	0	4	0	5	2	0
13. Global (8 + 9 + 10 + 11)	3	3	0	8	0	0
Total (1 + 12 +13)	4	17	1	27	3	12

Table 3 (Cont.). Frequency of Diagnostics.

Diagnostic Category	Total	Average
1. Syntax	82	4.56
2. Command Repetition	8	0.44
3. Uninformative Formats	0	0.00
4. Null Sets Created	24	1.33
5. Unused Sets	4	0.22
6. Time	10	0.56
7. Viewing Requests Excessive	19	1.06
8. String/Cycle Length	21	1.17
9. Thrashing	0	0.00
10. Dwelling	0	0.00
11. Relevance	61	3.39
12. Local (2 + 3 + 4 + 5 + 6 + 7)	65	3.61
13. Global (8 + 9 + 10 + 11)	79	4.39
Total (1 + 12 + 13)	229	12.72

Table 4. Totals and Averages.

and from the machine records. One of the questions on the post-training questionnnaire asked the students to report the percentage of items retrieved in the search that were "Very Useful," "Useful," and "Useless." Since the ultimate criterion for the value of the information retrieved lies in the judgment of the user, this was felt to be a particularly important index to the success of the system. The average percentage reported for the very useful category was 25.4%, with a range from 0.0% to 80.0%. The useful category ranged from 0.0% to 100.0%, with an average of 34.9%. The useless category also ranged from 0.0% to 100.0%, but the average was 39.6%. Thus, the average percentage of useful items was just over 60.0%, with a range from 0.0% to 100.0%. For purposes of simplification, the variable reported in Table 5 is the total percentage useful. Also reported in Table 5 are the intercorrelations of the various variables with the three major categories of diagnostic faults or errors.

The remaining variables in Table 5 all come from the post-training questionnaire. On the third page of this questionnaire, the students were asked to rate the degree to which they agreed or disagreed with the idea that the use of IIDA had been easier than expected. This item was scored with one being "strongly disagree" and five being "strongly agree." The average was 3.00, with a standard deviation 0.14. Another variable from this same page asked the students to rate their degree of agreement with the statement that they would recommend that others who want to do bibliographic searching learn through IIDA. Again, this item was scored with one being "strongly disagree" and five being "strongly agree." The average was 2.89, with a standard deviation of 0.96. The third major variable from this page of the questionnaire asked the students to rate their degree of certainty that they would re-use the system if they had access

	1	2	3	4	5	6	7	8	9	10
1. Satisfaction	1.00									
2. Liking	.87*	1.00								
3. Attitude	.71*	.83*	1.00							
4. Easier	.81*	.72*	.61*	1.00						
5. Recommend	.53*	.68*	.60*	.53*	1.00					
6. Re-use	.23	.47*	.59*	.18	.55*	1.00				
7. Global Faults	-.17	.06	.00	-.16	.14	.12	1.00			
8. Local Faults	-.27	-.09	-.12	-.29	.01	-.13	.67*	1.00		
9. Syntax Errors	-.61*	-.50*	-.45*	-.49*	-.57*	-.13	.04	.13	1.00	
10 % Useful Items	.55*	.52*	.50*	.24	.37	.18	-.36	-.22	-.54*	1.00

*$p \leq .05$

Table 5. Correlations Between Post-Training Measures.

to it. This scale was scored from one to five with five indicating complete certainty of re-use. The average rating here was 3.11, with a standard deviation of 1.13. All three of these averages are basically in the center of the scale.

The three remaining variables in Table 5 each represent the sum of three different sets of questions from the post-training questionnaire. The first six questions on the questionnaire asked the students to rate their degree of satisfaction with various aspects of the search they had just completed. These items were scored from one to four, with four being the most positive value. The sume of these six ratings was computed and taken as a measure of the individual's satisfaction with the search experience as a whole. The average total was 16.17, with a standard deviation of 3.36. This average basically indicates a moderate degree of satisfaction with the search process.

On the second page of the post-training questionnaire, there was a series of questions assessing the individual's agreement with positive statements about the IIDA search system. Each of these items was scored on a scale from one to five, with five being the most positive or favorable response about the IIDA search system. The sum of these eight scales was computed, and taken as a measure of the individual's liking for the IIDA search system. The average total was 24.00, with a standard deviation of 7.60. This average basically indicates neither liking for, nor a dislike for, the IIDA search system.

Finally, the questionnaire also contained a set of six bi-polar adjective scales assessing the student's attitude toward using the computer for a classroom assignment. The scales were scored from one to seven, with seven being assigned to the favorable end of the scale. For each student,

the individual scale ratings were totaled across the six scales. The average total was 22.39, with a standard deviation of 7.51. This average basically indicates a moderate negative attitude toward using a computer for a classroom assignment.

From the correlations in Table 5, it can be seen that the three attitude measures--satisfaction, liking, attitude--are highly correlated with each other. Considering the degree of intercorrelation, and the location of each of these measures along a dimension from positive to negative, it seems safe to argue that the student user group from the technical writing classes did not, on the average, particularly like or dislike the searching and search training.

There is some indication that the students were less positive than they might have been in part because the search training and searching turned out to involve more work than they had originally expected. This is supported by three bits of evidence. First, note in Table 5 the strong positive correlation between the students' responses to the statement that the use of IIDA was easier than expected. Those users who were more negative about the searching and search experience were also more likely to disagree with the idea that searching was easier than expected. Also, one set of attitude questions, the bi-polar scales, was among the questions which appeared on both the pre- and post-training questionnaires. These scales were the only ones to show any significant change from the pre- to the post-training questionnaire. On the pre-training administration of the scales, the average total score was 26.9, with a standard deviation of 6.24. The difference between the pre- and post-training scores represents a statistically significant decline ($t = 2.62$, $df = 17$, $p < .05$, two-tailed). Finally, the comments made by the students both to the IIDA assistants and

in the open-ended questions on the post-training questionnaire indicated a fair amount of dissatisfaction with the amount of work required to produce what the students viewed as any kind of reasonable payoff. In particular, the negative comments focused upon the length and amount of detail required in exercise three.

One interesting idea that emerges from consideration of the pattern of correlations in Table 5 can be seen by focusing upon three sets of correlations. First, note the moderate positive correlations between the three attitude measures and the percentage of useful items retrieved. Next, note the moderate negative correlation between the number of syntax errors the user made and the percentage of useful items retrieved. Finally, note the moderate negative correlations between the number of syntax errors and the various attitude measures. This pattern suggests the possibility that a strong component of the students' evaluation of various aspects of the system was determined by the perceived utility of the information which they retrieved, and that a major determinant of the utility of the retrieved information was the number of syntax errors made by the student. This could result from the fact that a high frequency of syntax errors should make it more difficult for a novice user to retrieve any kind of information, let alone useful information.

(d) Post-training comments. When asked to give their positive impressions of IIDA, all but a few of the undergraduate users gave some feedback. Many of the positive comments were really directed toward the positive aspects of on-line searching in general, such as the ability to expand and combine sets. Overall, the aspects of IIDA most appreciated by this group of users were the availability of the help mode, the error notations, and the ability to make corrections before continuing. In

addition, several users noted that the commands were well defined, and that the instruction were clear and easily applied when they were doing their own unconstrained search in the assistance mode. A few of the participants reported appreciating the opportunity to give input about the relevance of the items retrieved.

When asked to give their negative impressions of IIDA, some of the users complained of too much information being provided in a very short amount of time. They reported finding it difficult to digest the information. Although some of the users complained that the help instructions were confusing or too lengthy, other aspects of the instructions and information provided seemed too brief or sketchy to the users. For example, a few participants indicated being unclear about the "hierarchy" (i.e., file, set, articles) of the system, and felt that more information would have been helpful. The single feature which brought the greatest number of complaints was the IIDA response time limitation, i.e., logoff in ninety seconds if the user does not respond. Another source of irritation to the user was the mechanical delays and disruptions of the system which resulted from such problems as network disruptions or DIALOG computer problems. Finally, the IIDA assistants noted that many of the participants felt uncomfortable with the length of exercise three. Often the participants reported negative responses to this exercise from fellow classmates even before experiencing it themselves. In fact, one participant refused to do exercise three on the basis of such reports.

When asked if there was anything that they did not find working with IIDA that they felt should be included, many users requested a list of commands, as they found continually looking back over their printout or referring to the help library to be too time consuming. In addition, the

users suggested a number of detailed kinds of ideas about various time saving methods. For example, one participant suggested a table listing the various modes of help available with a provision for direct access. Other suggestions included such ideas as a method to discontinue the printing of an abstract, a set of instructions, or the result of an EXPAND command. When asked to list situations in which IIDA did the wrong thing, a number of the participants provided detailed feedback about a number of instances. Virtually all of these instances resulted from previously undetected programming flaws.

If the users felt that they had learned enough about searching that they could search on their own without IIDA assistance, they were asked when they first decided this. Fewer than one-third of the users responded, and all reported that they felt they had mastered searching either after exercise three, or during the search done in the assistance mode ("exercise four"). When asked to explain their reasons for feeling that they could or could not search without IIDA assistance, those who felt they were familiar enough with the commands believed they could search without IIDA assistance. Those who did not feel comfortable with the commands, or who felt the system was too complicated, reported needing more experience with IIDA before they could search on their own.

(3) Discussion. It seems clear from the foregoing information that by the end of the summer of 1979, the IIDA system was in good enough shape to be able to provide the type of training and assistance necessary to enable novice users (at least some novice users) to do on-line bibliographic searching. Thus, one of the major goals of the project had been accomplished, i.e., the development of such a system in a computer based interactive framework. It is also clear, however, that a number of

substantive problems remained in that, while the average percentage of useful items retrieved by the technical writing user group was 60%, there were several users who were dissatisfied with the system, or who were unable (or possibly unwilling) to retrieve any references which they felt to be useful. Had the evaluation of the IIDA search assistance system ended with the studies reported here, a reasonable summation of the results of the project would have been, "It seems to work, but major improvements remain to be made."

The summer studies were, however, pilot testing for subsequent field experiments to be reported in the final Quarterly Report. Several lessons were learned from the use of the IIDA system by the technical writing students, which led to major benefits in the field studies. One obvious benefit from the pilot testing lay simply in the use of the instructional and assistance programs with "real" users searching "real" problems. There were some technical and programming problems uncovered. In addition, this testing, along with the network transmission and other technical problems encountered during the summer, motivated a detailed search by search comparison between the search transcripts and the machine kept records of search activity. The results of this comparison led to improvements in the operation of the automatic record keeping functions of the various programs.

Some additional benefits which accrued from the summer pilot testing involved the questionnaires and the research assistants. The extensive feedback from the technical writing students included commentary about not only the system, but also the questionnaires. This feedback, and the examination of the data provided by the questionnaires themselves, led to a considerable shortening and some minor modifications in format and style of the questions in the development of the field test questionnaires. The

assistants involved in the project gained invaluable experience from the pilot testing in dealing with the problems of working with the system, of working with the users being trained, of coping with the problems of scheduling users, and of conforming to the needs of a research plan. The assistants were also able to develop a number of important ideas and insights in the operation of the system and the problems of the users.

In addition, as a result of the experiences with the technical writing user group, modifications of the instructional exercises were introduced to either clarify the information or to make the exercise more palatable. The types of changes made to exercise one were primarily those of clarification. For example, at first some students expected to retrieve actual facts about their topic rather than the references. Others did not initially seem to realize that the commands in exercise one were to be learned for future use. Still others displayed conceptual misunderstanding. At the time of the summer testing, exercise one employed an example search on Library Automation as a format for introducing the various search commands and illustrating their use. At one point in the search, IIDA asked the user to enter EXPAND LIBRARY. A few of the users were not entirely clear about how to use EXPAND, however, as illustrated by the fact that they subsequently thought they should enter EXPAND LIBRARY no matter what the term was that was to be expanded. All of these problems were spotted early in the testing, and appropriate changes to exercise one were introduced.

There was also an extensive revision of the structure of exercise three. In its original format, this exercise consisted of eight frames, with extensive discussion and detailed elaboration of the material in each as a form of advanced training. Since each user was required to go through all of the material in exercise three, the total time required to complete

the exercise averaged about forty minutes. This was subsequently changed, in that the structure of the program was modified to require the student to be exposed to only the introductory descriptions of the various advanced training materials. Thus the user is now required to take a reference walk through exercise three in order to become familiar with the contents of the advanced training material, e.g., to learn that one can truncate without being required to actually try a truncation at the time one first learns truncation is possible. The user is given the option of learning more in exercise three on a self-selected advanced study basis, or of returning to the contents of exercise three, in the form of the help library, when necessary during work in the assistance mode.

3. REFERENCES

1. Individualized Instruction for Data Access (IIDA), Quarterly Progress Report No. 3, NSF Grant No. DSI 77-26524, Philadelphia, Drexel University School of Library and Information Science and Franklin Research Center, December, 1978.

2. Fenichel, Carol Hansen, Online Information Retrieval: Identification of Measures that Discriminate Among Users with Different Levels and Types of Experience, Ph.D. Dissertation, Philadelphia, Drexel University School of Library and Information Science, 1979.

3. Individualized Instruction for Data Access (IIDA), Quarterly Progress Report No. 4, NSF Grant No. DSI 77-26524, Philadelphia, Drexel University School of Library and Information Science and Franklin Research Center, March, 1979.

4. APPENDICES

APPENDIX A: Fundamentals of Library and Information Science User Group Standard Search Topics

Search Number 1:

A user wants a search on school busing and racial integration in elementary schools.

He would like about 60 citations.

Use: ERIC (file 1)

Search Number 2:

A user would like information on collective bargaining in college and university libraries.

He wants about 60 citations.

Use: ERIC (file 1)

APPENDIX B: Fundamentals of Library and Information Science User Group Questionnaires

Bibliographic Searching

Pre-Search Questionnaire

Name: _____

Code Word: _____

College: _____

Year of College: _____

Sex: _____

Individualized Instruction for Data Access (IIDA) Laboratory

105 Stratton Hall

Summer, 1979

We would like to have you give us some information about yourself so that we have a better idea of the needs and interests of our users. On the following pages you will find several questions. Some call for a written answer others, for a check mark indicating your choice among several alternatives. Even if you find some of the questions strange or inappropriate it is important that you complete them all.

1. What is (was) your undergraduate major in college? (Be as specific as possible) _____

2. Year undergraduate degree received or expected. _____

3. Do you have any graduate degrees? Yes: _____ No: _____

   If, yes, what degree(s) in what area(s)? (e.g, M.S. in Psychology)

   _____

   _____

4. Please give a brief description, with field and title, of any full-time jobs you may have held during the last five years.

   _____

   _____

   _____

   _____

5. Please give a brief description, with field and title, of the full-time job you would most like to be working at five years from now.

   _____

   _____

   _____

   _____

How much course work beyond the High School level have you had in each of the following: (please check one box for each area)

	None	Only Introductory courses	Introductory plus Intermediate courses	Advanced Training
Math				
Computer Science				
Physical Science				
Engineering				
Biology				
Social Sciences (e.g., History, Political Science, etc.)				
Behavioral Sciences (e.g., Psychology, Sociology, etc.)				

Have you ever had anyone do on-line computerized bibliographic searching for you?

Yes: _____ No: _____

If yes, roughly how many times or how often? _____

Have you, youself, ever done any on-line searching before?

None: _____ Some: _____ A lot: _____

Do you know any computer languages? Yes: _____ No: _____

If yes, which one(s)? _____

How would you describe your computer programming skills?

_____ :Non-existant
_____ :Poor
_____ :Good enough to get by
_____ :Quite good
_____ :Excellent

Have you ever used packages of statistical programs such as SPSS or SAS for data analysis or other statistical work?

Yes: _____ No: _____

If yes, how often?

_____ :Very rarely
_____ :Occasionally
_____ :Regularly
_____ :Quite often
_____ :Very often

When you have identified a classroom problem, how do you identify the information you need. That is, to what extent do you rely on the following individuals or resources?

Asking teachers:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking friends:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably:

Asking parents:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Going to the library:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking the librarian:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Intuition should play very little role in solving problems:

:_____:_____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I do not like using the computer for classroom assignments:

:_____:_____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I believe that every problem should have a clear solution:

:_____:_____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

One of the benefits of an education is that it helps you to learn how to solve problems:

:_____:_____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

There should be a set of routine procedures to follow in solving problems:

:_____:_____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I believe that using a computer for a classroom assignment will be:

complex:____:_____:_____:_____:_____:_____:____:simple
very quite slightly neither slightly quite very

boring:____:_____:_____:_____:_____:_____:____:interesting
very quite slightly neither slightly quite very

painful:____:_____:_____:_____:_____:_____:____:pleasurable
very quite slightly neither slightly quite very

unsuccessful:____:_____:_____:_____:_____:_____:____:successful
very quite slightly neither slightly quite very

worthless:____:_____:_____:_____:_____:_____:____:valuable
very quite slightly neither slightly quite very

frustrating:____:_____:_____:_____:_____:_____:____:not frustrating
very quite slightly neither slightly quite very

Bibliographic Searching

Post-Search Questionnaire

Name: _____

Code Word: _____

Individualized Instruction for Data Access (IIDA) Laboratory

105 Stratton Hall

Summer, 1979

How do you feel about the amount of effort you made during the search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the amount of time you spent in the process?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the kind of assistance you received from the system?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the procedures which preceded the actual search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about your total search experience?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the items you retrieved?

:_____:_____:_____:_____:
very dissatisifed dissatisfied satisfied very satisfied

How do you feel about the search as a whole?

:_____:_____:_____:_____:
totally useless useless useful extremely useful

How do you feel about the results of the search itself?

:_____:_____:_____:
not at all useful moderately useful very useful--I got what I needed

Have you ever done any previous research on this topic?

Yes: _____ No: _____

Do you know of items on your search topic which were not retrieved?

_____ No, I know of none and retrieved at least the number of items I expected from the search.
_____ Yes, I know of a few items which I felt would have been retrieved.
_____ Yes, I know of several items which I expected to retrieve.
_____ No, I know of none but I did expect to retrieve a few more items than I did.
_____ No, I know of none but I did expect to retrieve many more items than I did.

Have you ever done any previous research on the topic of your search?

Yes:_____ No: _____

What percentage of the items retrieved would you say were:

Very useful: _____
Useful: _____
Useless: _____

Total: 100%

Would you recommend this system to your friends? Yes: _____ No: _____

The process of searching was similar to what I had expected:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was enjoyable:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was satisfactory:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was helpful in working on a class assignment or problem:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was instrumental in working on a class assignment or problem:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was characterized by instructions that were easy to follow:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was frustrating to use:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was stimulating to use:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

How much control do you feel you had over the results of the search?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

How much understanding of the information system do you feel you gained through your experience?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

How much certainty is there that you would use the system again if you had access to it?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

The use of IIDA was easier than I expected:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

I would recommend that others who want to learn to do bibliographic searching learn through IIDA:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The assistance mode of IIDA helped me to search more effectively:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Do you feel you have learned enough about searching that you could search on your own without IIDA?

Yes: _____ No: _____

If yes, when did you first decide that you knew enough about the process to do it on your own?

Please explain your reasons for why you feel you could or could not search on your own without IIDA assistance.

Please describe your overall impressions of working with IIDA.

Positive Impressions: (What did IIDA do or say that you liked most?)

Negative Impressions: (What did IIDA do or say that you liked least?)

Please describe any situations where IIDA did the wrong thing.

Was there anything that you didn't find in working with IIDA that you think should be included?

When you have identified a classroom problem, how do you identify the information you need. That is, to what extent do you rely on the following individuals or resources?

Asking teachers:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking friends:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking parents:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Going to the library:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking the librarian:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Using a computer for a classroom assignment was:

complex:____:____:_____:_____:_____:____:____:simple
very quite slightly neither slightly quite very

boring:____:____:_____:_____:_____:____:____:interesting
very quite slightly neither slightly quite very

painful:____:____:_____:_____:_____:____:____:pleasurable
very quite slightly neither slightly quite very

unsuccessful:____:____:_____:_____:_____:____:____:successful
very quite slightly neither slightly quite very

worthless:____:____:_____:_____:_____:____:____:valuable
very quite slightly neither slightly quite very

frustrating:____:____:_____:_____:_____:____:____:not frustrating
very quite slightly neither slightly quite very

I did not like using the computer for a classroom assignment:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

There should be a set of routine procedures to follow in solving problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Intuition should play very little role in solving problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

One of the benefits of an education is that it helps you to learn how to solve problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

I believe that every problem should have a clear solution:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Solving a research or design problem often requires several steps, some of which may be repeated several times before the problem is solved.

These typically involve:

a) recognizing the problem exists
b) defining the problem
c) breaking the problem up into sub-problems
d) selecting one of the sub-problems for "solution"
e) generating options
f) selecting an option
g) implementing the option
h) evaluation of the result

At what point(s) in the problem-solving process is(are) bibliographic materials most useful?

At what point(s) have you typically used bibliographic searching?

At what point(s) can you imagine yourself making use of these resources?

At what point(s) would you recommend to others that they try bibliographic searching?

Behavior Description

Check the word or group of words following each statement that best describes how you feel about the statement.

I try to be the dominant person when I am with people.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I try to take charge of things when I am with people.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I try to have other people do things I want done.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I try to influence strongly other people's actions.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I try to influence strongly other people's actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I try to have other people do things the way I want them done.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I try to have other people do things the way I want them done.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I take charge of things when I'm with people.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I try to take charge of things when I'm with people.

:_____:_____:_____:_____:_____:_____:
usually often sometimes occasionally rarely never

I let other people decide what to do.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let other people decide what to do.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people take charge of things.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people strongly influence my actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people strongly influence my actions.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let other people control my actions.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I am easily led by people.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let people control my actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I am easily led by people.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

APPENDIX C: Technical Writing Course Requirements

INTRODUCTION

This is a practical course in expository writing for advanced students in technical and scientific fields. It is based on the assumption that when you become professionals you will spend a considerable part of your time writing documents like memos, letters and reports.

RHETORICAL MODEL

All writing, and especially professional writing, results from the writer's assessment of the rhetorical situation: the relationship among writer, audience, subject, and purpose. This course is organized around this model. Three activities are particularly emphasized: finding something to say, saying it (expression), and saying it (forms). The first and second of these are taken up in order in the course and provide the pattern of organization for readings and discussions. The third, forms, is discussed throughout the course at appropriate points.

WRITING ASSIGNMENTS

Each student will be responsible for seven written assignments: a memo on sources, a proposal, an oral progress report, a popular article, a letter of transmittal, an abstract, and a final report.

ATTENDANCE

Attendance in class is mandatory. Excessive unexcused absences will result in failure of the course.

GRADING

Final grades will reflect the student's progress over the term in writing clearly and effectively and in the appropriate forms.

DEADLINES

Assignments are due on the dates indicated on the syllabus and Instructions for Assignments. Late papers will be reduced in grade.

GENERAL REQUIREMENTS FOR PAPERS

1. Type all papers
2. Use 8 1/2 by 11 inch paper
3. Leave 1 1/2 inch margins on all sides
4. Double space unless specifically instructed to do otherwise
5. Secure pages with a paper clip or binder
6. Submit each with a cover sheet stating your name, name of assignment, date, instructor's name

MEMO ON SOURCES

Due:
Audience: Fellow students in your major field

Write a memo answering the following questions (begin with a good lead sentence):

1. Which guides, bibliographies, indexes, and abstract services are pertinent to your field? Give full citations and a brief description of each.
2. Which five journals are considered significant in your field? Describe the kinds of articles each publishes and the audience it aims to reach. Do not summarize the articles but describe their general content and form and style of presentation.
3. Attach as an appendix a photocopy of the Instructions to Authors page(s) from one of the journals and/or note the names of the style guides that assist authors in preparing manuscripts for the journals.

2-3 pp.

PROPOSAL (Options A and B)

Due:
Audience: a potential sponsor

In Option A, the proposal should be addressed to a potential sponsor (faculty member, industiral supervisor, research agency, etc.). It should be tailored to the sponsor's specifications. It should include headings within the text and may include visuals, if they are relevant. Its purpose is to persuade the sponsor to allow you to undertake an activity leading to the final report. In general, the proposal should include the following:

1. Statement of purpose and definition of research problem.
2. Background. Establish the context for the investigation, give a history of the problem, the need for a solution and the benefits that will result from your investigation.
3. Basic procedure you will use to complete your investigation.
4. Previous experience and facilities description.
5. Estimate of likelihood of success.
6. List of tasks to be performed and task schedule.
7. Request for permission to undertake work.

3-4 pp.

In Option B, the proposal should be in the form of a letter addressed to the editor of a particular journal that might be interested in a review of literature on a topic of interest to you. You should find out the name and address of the editor of the particular journal you think most suitable. Address the following topics in your letter:

1. Purpose of the review. Explain why the topic you have chosen to examine is significant to readers of the journal at this time.
2. Tentative plan of development of your article. Discuss topics you will or will not discuss.
3. Survey of the literature. Show your familiarity with major articles, books, and reports in the field as a preliminary to the extensive discussion you will present in the article.
4. Your qualifications. Introduce yourself to the editor as someone suitable to do the review.
5. Schedule. Indicate when you could submit the article.
6. Final sales pitch. Answer the editor's legitimate question: "Why should you do an article on this topic for readers of this journal at this time?"

3-4 pp.

ORAL PROGRESS REPORT

Due:
Audience: your classmates

The progress report should be addressed to the class. Its purpose is to report progress made toward completion of the final report. Refer to the original proposal in describing progress made, problems encountered, modifications in plan, and the current status of the work.

POPULAR ARTICLE

Due:
Audience: the readers of a nontechnical magazine or newspaper

The popular report is intended for a popular audience, specifically readers of a magazine like Popular Mechanics, Smithsonian, Psychology Today, or Today's Health. The report should adapt information gathered for your final report for this audience. First analyze articles of this type for viewpoint, level of language, organization, style, type of material of interest, interest-getting devices such as titles and leads. Match your approach to the audience; sell your report. You may inform, convince, advise, or entertain the reader. Your article should be lively and readable. You may be more personal than in your final report. Make good use of such interest-getting devices as comparisons, analogies, and examples that tie in with the experience of the audience and add vigor to the presentation. Catch their attention.

3-4 pp.

LETTER OF TRANSMITTAL

Due:
Audience: the person(s) for whom your final report will be written

The letter of transmittal should be addressed to the sponsor (Option A)

or the editor (Option B) who will receive your final report. It should explain in summary form what your report includes and offer to submit additional information if it is needed.

1-2 pp.

ABSTRACT

Due:
Audience: any person who may be interested in doing research in the area you are investigating for your final report

The abstract is a summary of the contents of your final report. It should tell in several hundred words what is found in more detail in the text of the research report. The word ABSTRACT should be typed at the top center of the page in capital letters. The summary which follows should be written in sentence and paragraph form. (See Psychological Abstracts for examples.)

FINAL REPORT (Options A and B)

Due:
Audience: sponsor

The final report is a record of your investigation into a problem for the sponsor who accepted your initial proposal. It should be tailored to that audience's requirements; you need to know what that audience wants and what action it can take after reading your report. The results of your research should be presented in an organized and concise manner. Visuals should be included in places where they will clarify points made in the text. The report should contain an introduction, body and conclusion.

7-8 pp.

Option B should be written for the editor to whom your proposal was addressed. The review of literature should be a creative synthesis of what has been written on a topic, not a paste-up of direct quotations, which should be used sparingly if at all. The article should match the form of other articles in the journal in matters of both organization and documentation. Enough evidence drawn from current sources should be given to provide context for your interpretations and to support your generalizing statements.

7-8 pp.

APPENDIX D: Technical Writing User Group Questionnaires

Bibliographic Search Training

Pre-Training Questionnaire

Name:_____

Code Word:_____

College:_____

Year of College:_____

Sex:_____

Individualized Instruction for Data Access (IIDA) Laboratory

105 Stratton Hall

Summer, 1979

Since you are part of the first group to have any extensive experience with IIDA we would like to have you give us some information about yourself so that we have a better idea of the needs and interests of our users. On the following pages you will find several questions. Some call for a written answer others, for a check mark indicating your choice among several alternatives. Even if you find some of the questions strange or inappropriate it is important that you complete them all.

1. What is (was) your undergraduate major in college? (Be as specific as possible) _____

2. Year undergraduate degree received or expected. _____

3. Do you have any graduate degrees? Yes: _____ No: _____

   If, yes, what degree(s) in what area(s)? (e.g., M.S. in Psychology)

   _____

   _____

4. Please give a brief description, with field and title, of any full-time jobs (non-coop) you may have held during the last five years.

   _____

   _____

   _____

   _____

5. Please give a brief description, with field and title, of the full-time job you would most like to be working at five years from now.

   _____

   _____

   _____

   _____

How much course work beyond the High School level have you had in each of the following: (please check one box for each area)

	None	Only Introductory courses	Introductory plus Intermediate courses	Advanced Training
Math				
Computer Science				
Physical Science				
Engineering				
Biology				
Social Sciences (e.g., History, Political Science, etc.)				
Behavioral Sciences (e.g., Psychology, Sociology, etc.)				

Have you ever had anyone do on-line computerized bibliographic searching for you?

Yes: _____ No: _____

If yes, roughly how many times or how often? _____

Have you, yourself, ever done any on-line searching before?

None: _____ Some: _____ A lot: _____

Do you know any computer languages? Yes: _____ No: _____

If yes, which one(s)? _____

How would you describe your computer programming skills?

_____ :Non-existant
_____ :Poor
_____ :Good enough to get by
_____ :Quite good
_____ :Excellent

Have you ever used library packages such as SPSS or SAS for data analysis or other statistical work?

Yes: _____ No: _____

If yes, how often? _____:Very rarely
_____:Occasionally
_____:Regularly
_____:Quite often
_____:Very often

When you have identified a classroom problem, how do you identify the information you need. That is, to what extent do you rely on the following individuals or resources?

Asking teachers:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking friends:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking parents:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Going to the library:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking the librarian:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Intuition should play very little role in solving problems:

:_____:____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I do not like using the computer for classroom assignments:

:_____:____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I believe that every problem should have a clear solution:

:_____:____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

One of the benefits of an education is that it helps you to learn how to solve problems:

:_____:____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

There should be a set of routine procedures to follow in solving problems:

:_____:____:_____:_____:_____:
Strongly agree Agree Uncertain Disagree Strongly disagree

I believe that using a computer for a classroom assignment will be:

complex:___:____:_____:_____:_____:____:___:simple
very quite slightly neither slightly quite very

boring:___:____:_____:_____:_____:____:___:interesting
very quite slightly neither slightly quite very

painful:___:____:_____:_____:_____:____:___:pleasurable
very quite slightly neither slightly quite very

unsuccessful:___:____:_____:_____:_____:____:___:successful
very quite slightly neither slightly quite very

worthless:___:____:_____:_____:_____:____:___:valuable
very quite slightly neither slightly quite very

frustrating:___:____:_____:_____:_____:____:___:not frustrating
very quite slightly neither slightly quite very

Bibliographic Search Training

Intermediate Questionnaire

Name: _____

Code Word: _____

Individualized Instruction for Data Access (IIDA) Laboratory

105 Stratton Hall

Summer, 1979

How do you feel about the amount of effort you made during the search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the amount of time you spent in the process?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the kind of assistance you received from the system?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the procedures which preceded the actual search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about your total search experience?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the items you retrieved?

:_____:_____:_____:_____:
very dissatisifed dissatisfied satisfied very satisfied

How do you feel about the search as a whole?

:_____:_____:_____:_____:
totally useless useless useful extremely useful

How do you feel about the results of the search itself?

:_____:_____:_____:
not at all useful moderately useful very useful--I got what I needed

Have you ever done any previous research on this topic?

Yes: _____ No: _____

Do you know of items on your search topic which were not retrieved?

_____ No, I know of none and retrieved at least the number of items I expected from the search.
_____ Yes, I know of a few items which I felt would have been retrieved.
_____ Yes, I know of several items which I expected to retrieve.
_____ No, I know of none but I did expect to retrieve a few more items than I did.
_____ No, I know of none but I did expect to retrieve many more items than I did.

Have you ever done any previous research on the topic of your search?

Yes:_____ No: _____

What percentage of the items retrieved would you say were:

Very useful: _____
Useful: _____
Useless: _____

Total: 100%

Would you recommend this system to your friends? Yes: _____ No: _____

The process of searching was similar to what I had expected:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was enjoyable:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was satisfactory:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was helpful in working on a class assignment or problem:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was instrumental in working on a class assignment or problem:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was characterized by instructions that were easy to follow:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was frustrating to use:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was stimulating to use:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Please describe your overall impressions of working with IIDA.

Positive Impressions: (What did IIDA do or say that you liked most?)

Negative Impressions: (What did IIDA do or say that you liked least?)

Please describe any situations where IIDA did the wrong thing.

Was there anything that you didn't find in working with IIDA that you think should be included?

Bibliographic Search Training

Post-Training Questionnaire

Name: _____

Code Word: _____

Individualized Instruction for Data Access (IIDA) Laboratory

105 Stratton Hall

Summer, 1979

How do you feel about the amount of effort you made during the search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the amount of time you spent in the process?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the kind of assistance you received from the system?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the procedures which preceded the actual search?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about your total search experience?

:_____:_____:_____:_____:
very dissatisfied dissatisfied satisfied very satisfied

How do you feel about the items you retrieved?

:_____:_____:_____:_____:
very dissatisifed dissatisfied satisfied very satisfied

How do you feel about the search as a whole?

:_____:_____:_____:_____:
totally useless useless useful extremely useful

How do you feel about the results of the search itself?

:_____:_____:_____:
not at all useful moderately useful very useful--I got what I needed

Have you ever done any previous research on this topic?

Yes: _____ No: _____

Do you know of items on your search topic which were not retrieved?

_____ No, I know of none and retrieved at least the number of items I expected from the search.
_____ Yes, I know of a few items which I felt would have been retrieved.
_____ Yes, I know of several items which I expected to retrieve.
_____ No, I know of none but I did expect to retrieve a few more items than I did.
_____ No, I know of none but I did expect to retrieve many more items than I did.

Have you ever done any previous research on the topic of your search?

Yes:_____ No: _____

What percentage of the items retrieved would you say were:

Very useful: _____
Useful: _____
Useless: _____

Total: 100%

Would you recommend this system to your friends? Yes: _____ No: _____

The process of searching was similar to what I had expected:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was enjoyable:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was satisfactory:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was helpful in working on a class assignment or problem:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was instrumental in working on a class assignment or problem:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA searching just completed was characterized by instructions that were easy to follow:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was frustrating to use:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The IIDA search system I just worked with was stimulating to use:

:_____:____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

How much control do you feel you had over the results of the search?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

How much understanding of the information system do you feel you gained through your experience?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

How much certainty is there that you would use the system again if you had access to it?

:____:_____:_____:_____:_____:
none very little moderate considerable complete

The use of IIDA was easier than I expected:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

I would recommend that others who want to learn to do bibliographic searching learn through IIDA:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

The assistance mode of IIDA helped me to search more effectively:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Do you feel you have learned enough about searching that you could search on your own without IIDA?

Yes: _____ No: _____

If yes, when did you first decide that you knew enough about the process to do it on your own?

Please explain your reasons for why you feel you could or could not search on your own without IIDA assistance.

Please describe your overall impressions of working with IIDA.

Positive Impressions: (What did IIDA do or say that you liked most?)

Negative Impressions: (What did IIDA do or say that you liked least?)

Please describe any situations where IIDA did the wrong thing.

Was there anything that you didn't find in working with IIDA that you think should be included?

When you have identified a classroom problem, how do you identify the information you need. That is, to what extent do you rely on the following individuals or resources?

Asking teachers:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking friends:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking parents:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Going to the library:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Asking the librarian:

:_____:_____:_____:_____:_____:
not at all very little sometimes a moderate amount considerably

Using a computer for a classroom assignment was:

complex:____:_____:_____:_____:_____:_____:____:simple
very quite slightly neither slightly quite very

boring:____:_____:_____:_____:_____:_____:____:interesting
very quite slightly neither slightly quite very

painful:____:_____:_____:_____:_____:_____:____:pleasurable
very quite slightly neither slightly quite very

unsuccessful:____:_____:_____:_____:_____:_____:____:successful
very quite slightly neither slightly quite very

worthless:____:_____:_____:_____:_____:_____:____:valuable
very quite slightly neither slightly quite very

frustrating:____:_____:_____:_____:_____:_____:____:not frustrating
very quite slightly neither slightly quite very

I did not like using the computer for a classroom assignment:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

There should be a set of routine procedures to follow in solving problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Intuition should play very little role in solving problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

One of the benefits of an education is that it helps you to learn how to solve problems:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

I believe that every problem should have a clear solution:

:_____:_____:_____:_____:_____:
strongly agree agree uncertain disagree strongly disagree

Solving a research or design problem often requires several steps, some of which may be repeated several times before the problem is solved.

These typically involve:

a) recognizing the problem exists
b) defining the problem
c) breaking the problem up into sub-problems
d) selecting one of the sub-problems for "solution"
e) generating options
f) selecting an option
g) implementing the option
h) evaluation of the result

At what point(s) in the problem-solving process is(are) bibliographic materials most useful?

At what point(s) have you typically used bibliographic searching?

At what point(s) can you imagine yourself making use of these resources?

At what point(s) would you recommend to others that they try bibliographic searching?

You have just completed a search on a topic of your own choosing. Hopefully your search and its results will be useful in dealing with a research project or assignment where bibliographic information is necessary.

For the questions on the next two pages we would like you to assume that the search you just completed has not yet been done at all. Rather, assume that you have a search topic and you would like some information about that topic. You are going to use the services of a library intermediary who will perform a search for you. The following questions ask you to describe the topic of the search and to provide other information which the librarian may find useful in doing the search. (Note: Sometimes the search results you end up with are not the same as those you expected when you began the search. We would like you to describe the topic for the search you actually did rather than the topic for the search you started out to do.)

User Search Question

1. Please give in your own words a narrative description of the problem to be searched. Be specific; define phrases with special meaning. Append a list to your narrative of any synonyms, closely-related phrases, and alternative spellings. Please indicate if any words or phrases have a special use that you wish to exclude. Use scientific and technical as well as common vocabulary.

2. Unless already stated, please indicate any models, end uses, or applications that would be helpful in retrieving useful references for your problem.

3. Please state any topics related to (or applications of, or views of, or approaches to your specific problem that are not of interest if you wish to exclude retrieving citations to any documents on such topics.

_____
_____
_____

4. Please give a title to your problem.

_____
_____

5. Please list two or three of the most important authors (and/or organizations) publishing on your topic; complete names, if known, are helpful. Please indicate if you wish to exclude documents by any of these (or other) authors or organizations because of prior familiarity with their publications.

_____
_____
_____

6. Please list all Abstracting and Indexing Services (e.g., Chemical Abstracts, etc.) you want searched:

_____
_____
_____
_____
_____

7. Do you wish either to retrieve or not retrieve references to documents written in a particular language? _____Does not matter ____Retrieve English only

Retrieve only in _____ Do not retrieve in _____

8. Do you wish to limit the search to a particular time span?

:_____:_____:_____:
does not matter retrieve 1977 to date retrieve before 1977

Other _____

9. Please list the complete citations of two to three of the most useful articles on your search topic.

_____
_____
_____
_____
_____
_____
_____
_____
_____

Behavior Description

Check the word or group of words following each statement that best describes how you feel about the statement.

I try to be the dominant person when I am with people.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I try to take charge of things when I am with people.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I try to have other people do things I want done.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I try to influence strongly other people's actions.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I try to influence strongly other people's actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I try to have other people do things the way I want them done.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I try to have other people do things the way I want them done.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I take charge of things when I'm with people.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I try to take charge of things when I'm with people.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let other people decide what to do.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let other people decide what to do.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people take charge of things.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people strongly influence my actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I let other people strongly influence my actions.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let other people control my actions.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I am easily led by people.

:_____:____:_____:_____:_____:____:
usually often sometimes occasionally rarely never

I let people control my actions.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

I am easily led by people.

:_____:_____:_____:_____:_____:_____:
most people many people some people a few people one or two people nobody

APPENDIX E: Technical Writing User Group Exercise Two Search Topics

1. Violence in high schools. (file 1 or 201)

2. Passive solar energy used to heat residential buildings. (file 6 or 8)

APPENDIX F: Technical Writing User Group Assistance Mode Search Topics

Bibliographic Search Training

Search Topics -- Exercise 4

The following are some sample topics you may use in performing a search in Exercise 4.

1. Methods for designing buildings for collapse resistance.

2. Procedures for emergency core cooling in a nuclear reactor.

3. Methods for the design of a drilled pier foundation (caisson), taking into account the type of soil to be drilled into.

4. The use of microcomputers versus analog computers for monitoring instruments in nuclear power plants.

5. Analysis of the breakdown characteristics of diffused semiconductor junctions.

6. Methods of drying clothes or textile materials.

7. Use of orbiting satellites as remote environmental monitoring stations.

8. Use of wetlands or marshes as waste disposal sites.

9. The design of sewage plants' filtration capacities based on the expected inflow.

APPENDIX G: Procedures for Re-Scoring Diagnostic Records

As a result of considerable on-line interference during the searches, some of the faults reported by the computer were not caused by the searchers. They were, rather, mechanical or technical errors attributable to the system. Because of the relatively high frequency of errors caused by on-line interference, the search transcripts were re-examined by the IIDA staff, and the reported frequency of various faults was adjusted to remove those errors, which were in fact the result of a technical problem with the system.

The most frequently occurring mechanical or technical error resulted from noise on-line, or from telephone connection disorders. Noise interference basically consists of a string of characters and/or symbols which appears immediately following the DIALOG prompt (D?) which were not entered by the user. These glitches can be cancelled prior to entering a command, but, being unexpected, are often overlooked. This is particularly true for the novice user. These nonsense characters, which in most cases can be easily discriminated from a misspelling, are then incorporated into the command, which then leads to an error.

Another set of technical rather than syntax errors arose from the operation of the IIDA system. These were not only deleted from the syntax error category, but also brought to the attention of the system programmer, so that future repetitions could be minimized or avoided entirely. Discussed below are several examples of these kinds of "errors."

One user asked for help (/h), and received the list of titles for the eight frames of the Help library. This was followed by the instruction to enter one of the numbers indicating a choice from the list, or else to exit with a DIALOG command. Before the user had made her choice, IIDA printed the message that she had entered a DIALOG command, and therefore she had

left Help and returned to the main program. A DIALOG prompt followed. The user did not recognize the message, and entered the number of her choice from the Help menu. Because the user did not enter the DIALOG command, the IIDA system assumed she entered, a syntax error was reported. The IIDA staff recorded this as a technical error rather than a syntax error since it was obviously the fault of the system.

One user cancelled two characters, and continued to re-type the command correctly. Nevertheless, one of the characters was picked up, and IIDA rejected the command as a syntax error. Some users, when entering the BEGIN command, such as BEGIN 8, received a syntax error message explaining that argument '8' was not acceptable as only data bases 1, 6, 8, and 201 are allowed by IIDA. Other users received IIDA syntax error messages, after combining two legitimate sets, where the message claimed that one of the sets was null. All of these "errors" were re-coded as technical errors.

One legitimate syntax error occurs when the user "jumps the gun" by entering the initial part of a command, or the abbreviation of a command, before the DIALOG prompt is issued. When this occurs, the user may receive a message that reads, "argument does not begin with a number as it should." In one case, the user made an additional error because the original error message was misunderstood. This user re-entered the command prefixed by a number, and a second syntax error was reported. The IIDA staff discounted this second error, since it was caused by the misleading IIDA message.